沪制01150234号

Agilent 7890A
Gas Chromatograph

Operating Guide

Agilent Technologies

Notices

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CAUTION

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WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

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This document provides an overview of the individual components that make up the Agilent 7890A Gas Chromatograph (GC).

Where to Find Information

In addition to this document, Agilent provides several learning products that document how to install, operate, maintain, and troubleshoot the Agilent 7890A GC.

Before operating your GC, be sure to read the safety and regulatory information included on the Agilent GC and GC/MS Hardware User Information & Utilities DVD. The most common safety hazards when working on the GC are:

- Burns caused by touching heated areas on or in the GC
- Release of pressurized gas containing hazardous chemical compounds caused by opening inlets
- Glass cuts or puncture wounds caused by sharp capillary column ends
- Use of hydrogen as a GC carrier gas

Online User Documentation

Now your Agilent instrument documentation is in one place, at your fingertips.

The Agilent GC and GC/MS Hardware User Information & Utilities DVD that ships with your instrument provides an extensive collection of online help, videos, and books for current Agilent gas chromatographs, mass selective detectors, and GC samplers. Included are localized versions of the information you need most, such as:

- Getting Familiar documentation
- Safety and Regulatory guide
- Site Preparation information
- Installation information

- Operating guides
- Maintenance information
- Troubleshooting details

Chromatography Using a GC

Chromatography is the separation of a mixture of compounds into individual components.

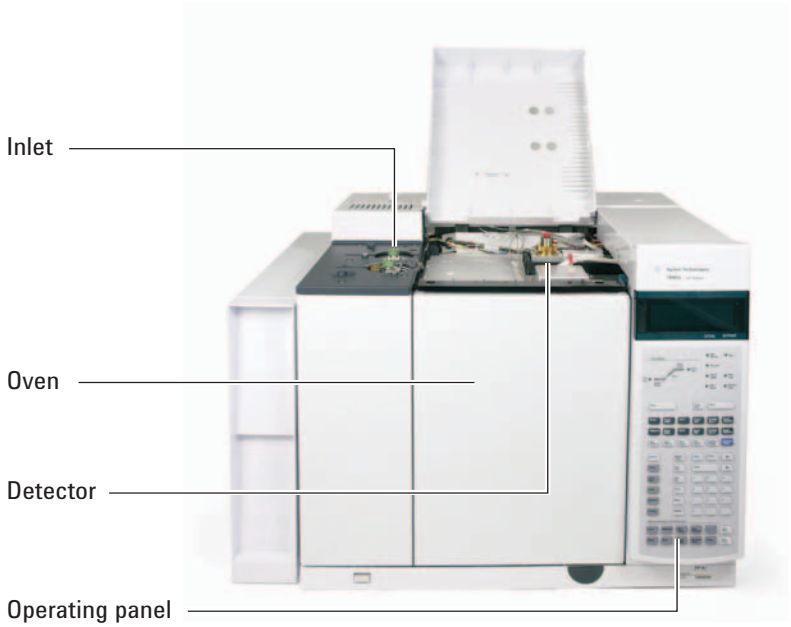
There are three major steps involved with separating and identifying components of a mixture using a GC. They are:

1 **Injecting** a sample into the GC. (This takes place at the inlet.)

2 **Separating** the sample into individual components. (This takes place inside the column in the oven.)

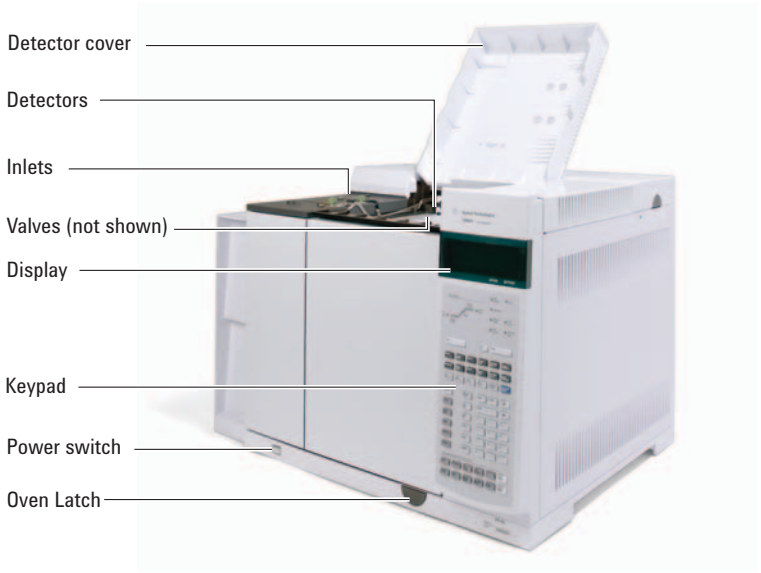
3 **Detecting** what compounds were in the sample. (This is done in the detector.)

During this process, status messages from the Agilent 7890A GC are displayed, and user changes to parameter settings can be made through the operating panel.

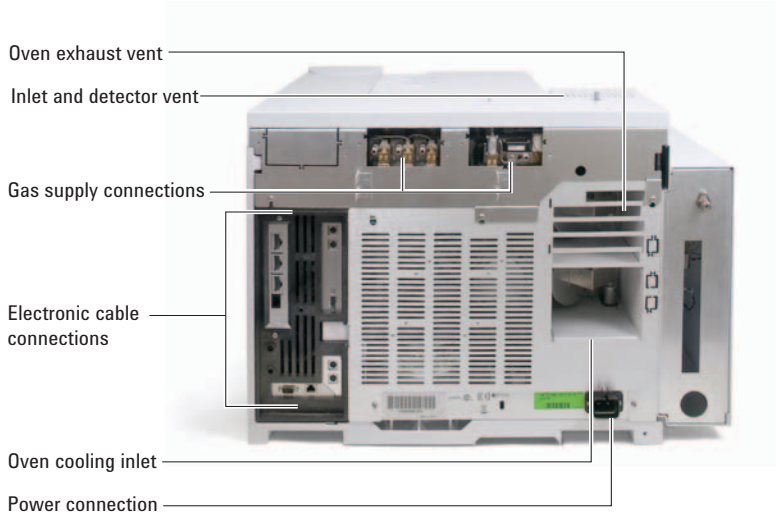


Each part of this process is described in brief on the following pages of this document. Refer to the Advanced User Guide for more details.

The Front View of the Agilent 7890A GC



The Back View of the Agilent 7890A GC

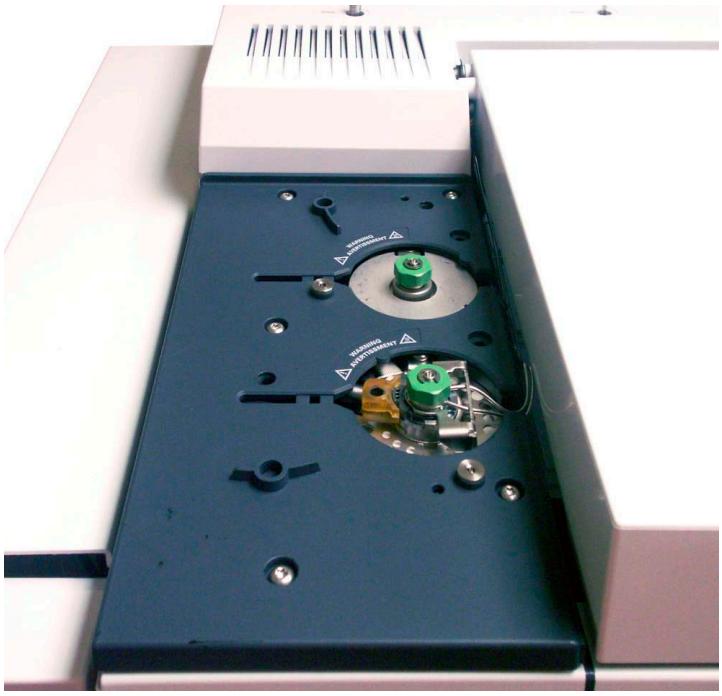


The Inlets

Inlets are where samples are injected into the GC. The Agilent 7890A GC can have a maximum of two inlets, identified as **Front Inlet** and **Back Inlet**.

A complete selection of inlets—split/splitless [0–100 psi and 0–150 psi], multimode, purged packed, cool-on-column, programmed temperature vaporization, and volatiles interface—are available.

The type of inlet chosen is based on the type of analysis being done, the type of sample being analyzed, and the column being used.

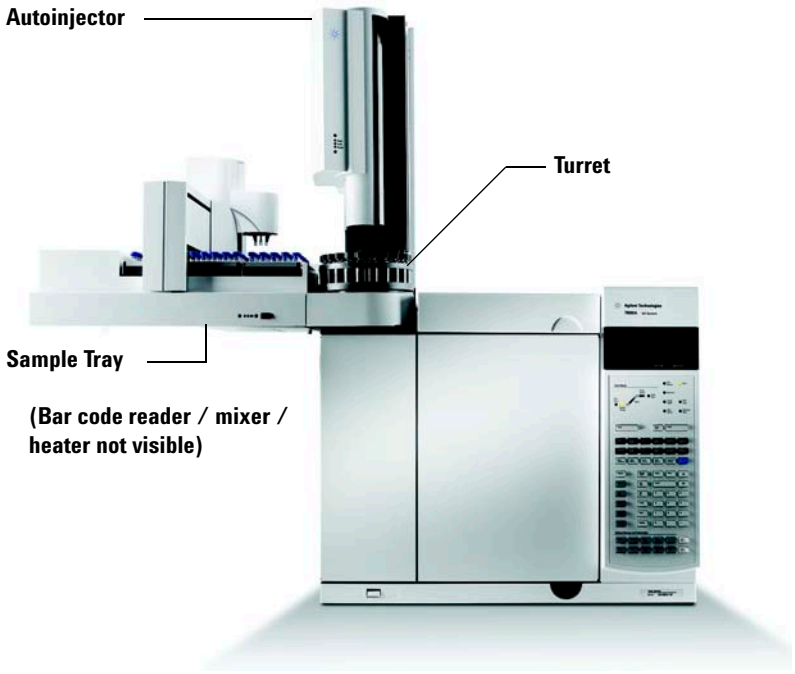


Samples can be injected into the inlets by hand using a syringe, or an automatic sampling device (such as an Agilent Automatic Liquid Sampler or Agilent Headspace Sampler).

Automatic injectors

The optional Agilent 7693A automatic liquid sampler (ALS) with a sample tray and bar code reader automates liquid sample processing. The modular design allows the autoinjector to be easily moved from one inlet to another or from one GC to another. The modular design also permits easy inlet maintenance.

The Agilent 7890A GC can accommodate up to two autoinjectors, identified as **Front Injector** and **Back Injector**.

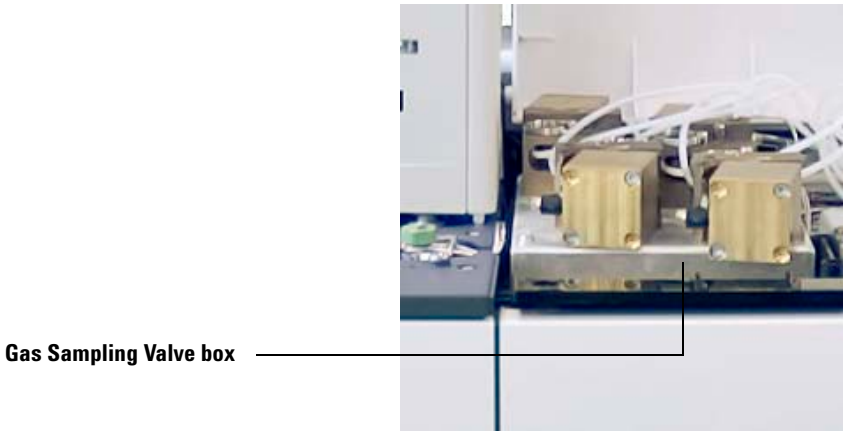


Automatic gas sampling valves

The sampling valves are simple mechanical devices that introduce a sample of fixed size into the carrier gas stream. Valves are most frequently used to sample gases or liquids in constantly flowing streams.

The Agilent 7890A GC can accommodate up to two gas sampling valves, identified as **Valve # 1** and **Valve #2**.

The valves are located inside the gas sampling valve box.

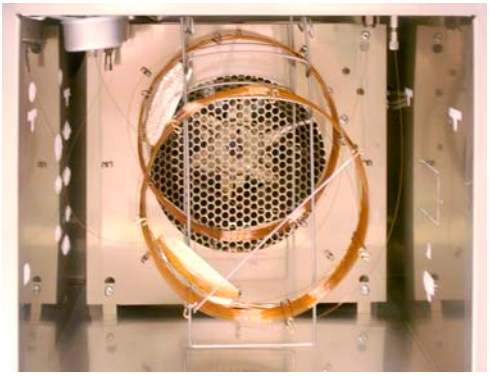


The GC Column and Oven

GC columns are located inside a temperature-controlled oven. Generally, one end of the column is attached to the inlet, while the other end is attached to the detector.

Columns vary in length, diameter, and internal coating. Each column is designed for use with different compounds.

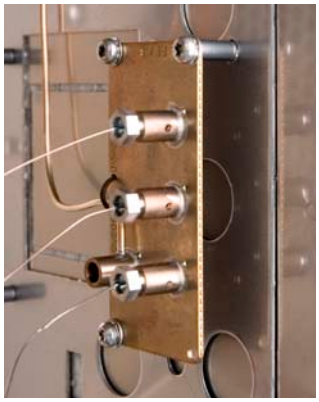
The purpose of the column and the oven is to separate the injected sample into individual compounds as it travels through the column. To aid this process, the GC oven can be programmed to speed the sample flow through the column.



Capillary Flow Technology

Agilent capillary flow technology (CFT) devices are used for splitting, heart cutting, and reliable zero dead volume connections. The features of the capillary flow technology make traditionally difficult connections simple, reliable, and leak free.

The optional CFT switches, splitters, and QuickSwap accessories are located on the inside of the oven wall. These devices are primarily used when the analysis requires multiple sample paths between the inlet and detectors. They allow the chromatographer to design very efficient sample paths using multiple columns or detectors. In addition, analysis time can be reduced with the benefit of backflushing.



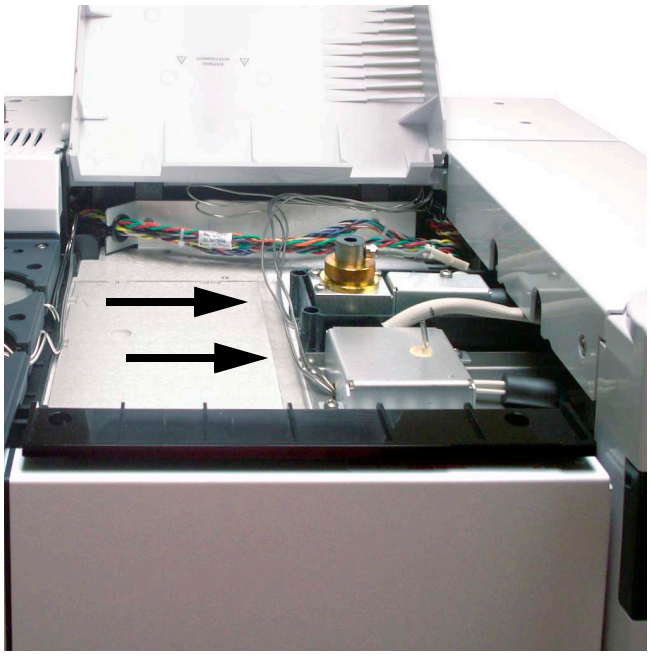
Detectors

Detectors identify the presence of compounds as they exit the column.

As each compound enters the detector, an electrical signal proportional to the amount of compound detected is generated. This signal is generally sent to a data analysis system—such as Agilent ChemStation—where it shows up as a peak on a chromatogram.

The Agilent 7890A GC can accommodate up to three detectors, identified as **Front Det**, **Back Det**, and **Aux Det.**

A complete selection of detectors (FID, TCD, NPD, FPD, µECD, MSD, Triple Quadrupole MS, and ICP-MS) is available. The type of detector chosen is based on the type of analysis required.



The Operating Panel

The operating panel consists of the display, status lights, and keypad. See "Keypad Operation" and the Advanced User Guide, along with the complete suite of documentation included on the Agilent GC and GC/MS Hardware User Information & Utilities DVD that shipped with your instrument for more detailed information.

The display

The display shows details of what is currently happening in the Agilent 7890A GC and allows you to make changes to parameters as necessary.

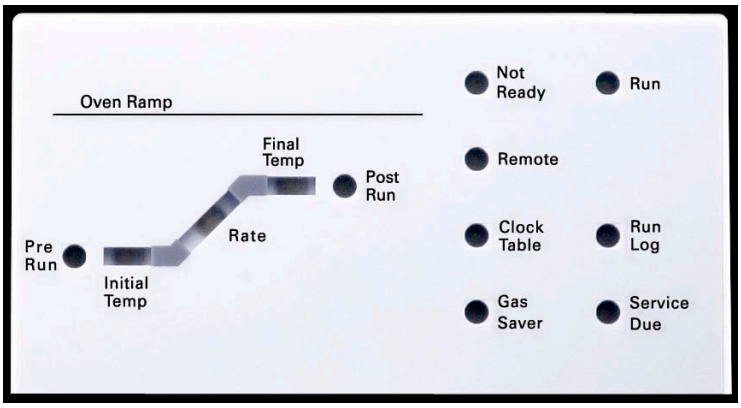
Use the scroll keys to view additional lines in the display.

A blinking asterisk (*) prompts you to press **[Enter]** to store a value or **[Clear]** to abort the entry. You cannot perform any other task until this is done.

Refer to "The keypad" and to "Keypad Operation" in this document, or to the Advanced User Guide for more details on how to interact with the displayed information.

Status lights

The status lights provide a basic look at what is currently happening inside the Agilent 7890A GC.



A lit LED on the status board indicates:

- The current progress of a run (**Pre Run**, **Post Run**, and **Run**).
- Items that may require attention (**Rate**, **Not Ready**, **Service Due**, and **Run Log**).
- The GC is controlled by an Agilent data system (**Remote**).
- The GC is programmed for events to occur at specified times (**Clock Table**).
- The GC is in gas saver mode (**Gas Saver**).

Beeping instrument

A series of warning beeps sound if the GC encounters a problem. For example, a series of beeps sound if the front inlet gas flow cannot reach setpoint. The message **Front inlet flow shutdown** is briefly displayed. The flow shuts down after 2 minutes. Press **[Clear]** to stop the beeping.

A continuous beep sounds if a hydrogen flow is shut down or a thermal shutdown occurs. Press **[Clear]** to stop the beep.

One beep sounds for other types of faults, warnings, and shutdowns. A single beep means that a problem exists, but the problem will not prevent the GC from executing the run. The GC will emit one beep and display a message. The GC can start the run and the warning disappears when a run starts.

Fault messages indicate hardware problems that require user intervention. Depending on the type of error, the GC will beep once or not at all.

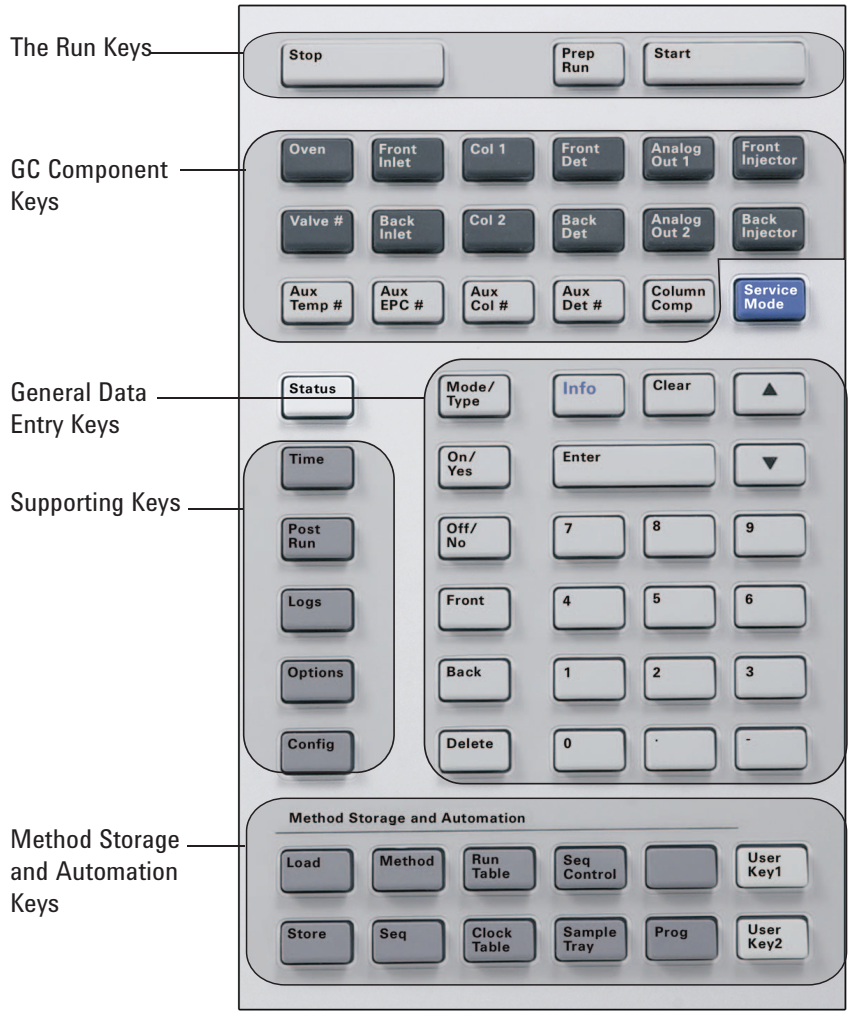
Blinking setpoint

If a gas flow, multiposition valve, or the oven is shut down by the system, **Off** or **On/Off** will blink on the appropriate line of the components parameter listing.

The keypad

All of the parameters required to operate the Agilent 7890A GC can be entered through the GC's keypad. Normally, however, most of these parameters are controlled using an attached data system, such as the Agilent ChemStation.

When the Agilent ChemStation is controlling your Agilent 7890A GC, it is possible for the ChemStation to disable editing of the GC's current method from the keypad.



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This section describes the tasks that an operator performs when using the Agilent 7890A GC.

Overview

Operating the GC involves the following tasks:

- Setting up the GC hardware for an analytical method.
- Starting up the GC. See "To Start Up the GC".
- Preparing the automatic liquid sampler. Install the method-defined syringe; configure solvent and waste bottle usage and syringe size; and prepare and load solvent, waste, and sample vials.
  - For the 7693A ALS, see its Installation, Operation, and Maintenance manual.
  - For the 7683 ALS, see "Operating the 7683 Automatic Sampler".
- Loading the analytical method or sequence into the GC control system.
  - See the Agilent data system documentation.
  - For standalone GC operation see "To load a method" and "To load a sequence".
- Running the method or sequence.
  - See the Agilent data system documentation.
  - For standalone GC operation, see "To manually inject a sample with a syringe and start a run", "To run a method to process a single ALS sample", and "To start running a sequence".
- Monitoring sample runs from the GC control panel or the Agilent data system program. See "About GC Status" or the Agilent data system documentation.
- Shutting down the GC. See"To Shut Down the GC for Less Than a Week" or "To Shut Down the GC for More Than a Week".

Instrument Control

The Agilent 7890A GC is typically controlled by an attached data system such as Agilent ChemStation. Alternately, the GC can be controlled entirely from its keypad, with output data being sent to an attached integrator for report generation.

Agilent Data System Users – Please refer to the online help included in the Agilent Data System for details on how to load, run, or create methods and sequences using the data system.

Standalone GC Users – If you are running your GC without an attached data system, for details on loading methods and sequences from the keypad see:

- "To load a method"
- "To load a sequence"

For details on running methods and sequences from the keypad see:

- "To manually inject a sample with a syringe and start a run"
- "To run a method to process a single ALS sample"
- "To start running a sequence"

Refer to the Advanced User Guide for details on how to create methods and sequences using the GC keypad.

Correcting Problems

If the GC stops operation because of a fault, for example a flow module shutdown after running out of carrier gas, do the following:

1. Use the keyboard or data system to stop the alert tone. Click **[Clear]** on the keyboard or turn off the offending component in the data system.
2. Resolve the problem, for example, by changing gas cylinders or fixing the leak. See the Troubleshooting Guide for details.
3. Once the problem is fixed, you may need to either power cycle the instrument, or use the software keyboard or data system to turn the problem component off, then on again. For shutdown errors, you will need to do both.

To Start Up the GC

Successful operation begins with a properly installed and maintained GC. The utility requirements for gases, power supply, venting of hazardous chemicals, and required operational clearances around the GC are detailed in the Site Preparation Checklist.

1 Check gas source pressures. For required pressures, see the Agilent GC, MSD, and ALS Site Preparation Checklist.

2 Turn on the carrier and detector gases at their sources and open the local shutoff valves.

3 Turn on the cryo coolant at its source, if used.

4 Turn on the GC power. Wait for **Power on successful** to be displayed.

5 If removed, install the column.

6 Check that the column fittings are leak free.

7 Load the analytical method.

8 Wait for the detector(s) to stabilize before acquiring data. The time required for the detector to reach a stable condition depends on whether the detector was turned off or its temperature was reduced while the detector remained powered.

Detector type	Stabilization time starting from a reduced temperature (hours)	Stabilization time starting from detector off (hours)
FID	2	4
TCD	2	4
ECD	4	18 to 24
FPD	2	12
NPD	4	18 to 24

To Shut Down the GC for Less Than a Week

1 Wait for the current run to finish.

2 If the active method has been modified, save the changes.

WARNING **Never leave flammable gas flows on if the GC will be unmonitored. If a leak develops, the gas could create a fire or explosion hazard.**

3 Turn off all gases, except the carrier gas, at their sources. (Leave the carrier gas on to protect the column from atmospheric contamination.)

4 If you are using cryogenic cooling, turn off the cryo coolant at the gas source.

5 Reduce detector, inlet, and column temperatures to between 150 and 200 °C. If desired, the detector can be turned off. See the following table to determine if it is advantageous to shut down the detector for a short time period. The time required to return the detector to a stable condition is a factor.

Detector type	Stabilization time starting from a reduced temperature (hours)	Stabilization time starting from detector off (hours)
FID	2	4
TCD	2	4
ECD	4	18 to 24
FPD	2	12
NPD	4	18 to 24

To Shut Down the GC for More Than a Week

1 Load a GC maintenance method and wait for the GC to become ready. For more information about creating maintenance methods, see the Maintaining Your GC manual. (If a maintenance method is not available, set all heated zones to 40 °C.)

2 Turn off the main power switch.

3 Shut off all gas valves at the gas source.

4 If you are using cryogenic cooling, shut off the cryo coolant valve at the source.

WARNING **Be careful! The oven, inlet, and/or detector may be hot enough to cause burns. If they are hot, wear heat-resistant gloves to protect your hands.**

5 When the GC is cool, remove the column from the oven and cap both ends to keep out contaminants.

6 Cap the inlet and detector column fittings and all GC external fittings.

3 Running a Method or a Sequence from the Keypad

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This section explains how to load, store, and run a method or sequence using the GC keypad, without the use of an Agilent data system. The keypad can be used to select and run a method or automated sequence stored in the GC and run it. In this case, the data generated from the run is normally sent to an integrator for the data analysis report.

For information on creating a method or sequence using keypad entry, see the Advanced User Guide.

Loading, Storing, and Running Methods from the Keypad

To load a method

1. Press **[Load]**.
2. Press **[Method]**.
3. Enter the number of the method to be loaded (1 through 9).
4. Press **[On/Yes]** to load the method and replace the active method. Alternatively, press **[Off/No]** to return to the stored methods list without loading the method.

To store a method

1. Ensure that the proper parameters are set.
2. Press [**Store**].
3. Press [**Method**].
4. Enter the number of the method to store (1 through 9).
5. Press [**On/Yes**] to store the method and replace the active method. Alternatively, press **[Off/No]** to return to the stored methods list without storing the method.

To manually inject a sample with a syringe and start a run

1. Prepare the sample syringe for injection.
2. Load the desired method. (See "To load a method".)
3. Press **[Prep Run]**.
4. Wait for **STATUS Ready for Injection** to be displayed.
5. Insert the syringe needle into the inlet and puncture the septum.
6. Simultaneously depress the syringe plunger to inject the sample and press **[Start]**.

To run a method to process a single ALS sample

1. Prepare the sample for injection.
2. Load the sample vial into the assigned location in the ALS tray or turret.
3. Load the desired method. (See "To load a method".)
4. Press **[Start]** on the GC keypad to initiate the ALS syringe cleaning, sample loading, and sample injection method.

After the sample is loaded into the syringe, the sample is automatically injected when the GC reaches the ready state.

To abort a method

1 Press **[Stop]**.

2 When you are ready to resume running analyses, load the appropriate sequence or method. (See "To load a method" or "To load a sequence".)

Loading, Storing, and Running Sequences from the Keypad

A sequence can specify up to five subsequences to be run, as well as priority (ALS only) and post-run sequences, if defined. Each sequence is stored as a number (from 1 to 9).

To load a sequence

1. Press **[Load][Seq]**.
2. Enter the number of the sequence to be loaded.
3. Press **[On/Yes]** to load the sequence or **[Off/No]** to cancel the load.

   An error message is displayed if the specified sequence number has not been stored.

To store a sequence

1. Press **[Store][Seq]**.
2. Enter the number of the sequence to be stored.
3. Press **[On/Yes]** to store the sequence or **[Off/No]** to cancel the store.

To start running a sequence

1. Load the sequence. (See "To load a sequence".)
2. Press **[Seq Control]**.
3. Verify the status of the sequence:
   - **Running**—the sequence is running
   - **Ready/wait**—the instrument is not ready (due to oven temperature, equilibration times, etc.)
   - **Paused**—the sequence is paused
   - **Stopped**—proceed to step 4
   - **Aborted**—the sequence stopped without waiting for the run to finish (See "Aborting a sequence".)
   - **No sequence**—the sequence is off or not defined
4. Scroll to the **Start sequence** line and press **[Enter]** to change the status to **Running**.

The **Run** LED will light and stay lit until the sequence is completed. The sequence continues to run until all subsequences are executed or until the sequence is aborted.

To pause a running sequence

1 Press **[Seq Control]**.

2 Scroll to **Pause sequence** and press **[Enter]**.

The sequence stops when the current sample run is complete.

To resume a paused sequence

1 Press **[Seq Control]**.

2 Scroll to **Resume sequence** and press **[Enter]**.

The sequence resumes with the next sample.

To stop a running sequence

1 Press **[Seq Control]**.

2 Scroll to **Stop sequence** and press **[Enter]**.

The sequence stops at the end of the currently running subsequence unless **[Seq] > Repeat sequence** is **On**. The sampler tray halts immediately.

To resume a stopped sequence

1 Press **[Seq Control]**.

2 Scroll to **Resume sequence** and press **[Enter]**.

The sequence restarts from the beginning of the sequence.

Aborting a sequence

When a sequence is aborted, it stops immediately without waiting for the current run to finish.

The following will cause a sequence to abort:

- The **[Stop]** key is pressed.
- A sampler error occurs, producing an error message.
- The GC detects a configuration mismatch during a method load.

- A running sequence tries to load a method that doesn't exist.
- The sampler is turned off.

To resume an aborted sequence

1. Correct the problem. (See "Aborting a sequence".)
2. Press **[Seq Control]**.
3. Scroll to **Resume sequence** and press **[Enter]**.

   The aborted sample run will be repeated.

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This section describes the basic operation of the Agilent 7890A GC keypad. For additional information on keypad functionality, see the Advanced User Guide.

The Run Keys

These keys are used to start, stop, and prepare the GC to run a sample.

[**Prep Run**] Activates processes required to bring the GC to the starting condition dictated by the method (such as turning off the inlet purge flow for a splitless injection or restoring normal flow from gas saver mode). See the Advanced User Guide for details.

[**Start**] Starts a run after manually injecting a sample. (When you are using an automatic liquid sampler or gas sampling valve, the run is automatically activated at the appropriate time.)

[**Stop**] Immediately terminates the run. If the GC is in the middle of a run, the data from that run may be lost. Refer to the Advanced User Guide for information on how to restart the GC after pressing **[Stop]**.

The Service Mode Key

[**Service Mode**] Is used to access maintenance functions and settings, service counters, and diagnostics for the GC. See the Advanced User Guide for details.

The GC Component Keys

These keys are used to set the temperature, pressure, flow, velocity, and other method operating parameters.

To display the current settings, press any one of these keys. More than three lines of information may be available. Use the scroll keys to view additional lines, if necessary.

To change settings, scroll to the line of interest, enter the change, and press **[Enter]**.

For context-sensitive help, press **[Info]**. For example, if you press **[Info]** on a setpoint entry, the help provided would be similar to: *Enter a value between 0 and 350.*

[**Oven**]	Sets oven temperatures, both isothermal and temperature programmed.
[**Front Inlet**] [**Back Inlet**]	Controls inlet operating parameters.
[**Col 1**] [**Col 2**] [**Aux Col #**]	Controls column pressure, flow, or velocity. Can set pressure or flow ramps.
[**Front Det**] [**Back Det**] [**Aux Det #**]	Controls detector operating parameters.
[**Analog Out 1**] [**Analog Out 2**]	Assigns a signal to the analog output. The analog output is located on the back of the GC.
[**Front Injector**] [**Back Injector**]	Edits injector control parameters such as injection volumes and sample and solvent washes.
[**Valve #**]	Allows for configuration or control of the gas sampling valve (GSV) and/or switching valves 1 to 8 on or off. Sets multiposition valve position.
[**Aux Temp #**]	Controls extra temperature zones such as a heated valve box, a mass selective detector, an atomic emission detector transfer line, or an “unknown” device. Can be used for temperature programming.
[**Aux EPC #**]	Provides auxiliary pneumatics to an inlet, detector, or other device. Can be used for pressure programming.
[**Column Comp**]	Creates a column compensation profile.

The Status Key

[**Status**]

Toggles between setpoint/actual values for most commonly reviewed parameters and displays “ready,” “not ready,” and “fault” information.

When the **Not Ready** status light is *blinking*, a fault has occurred. Press [**Status**] to see which parameters are not ready and what fault has occurred.

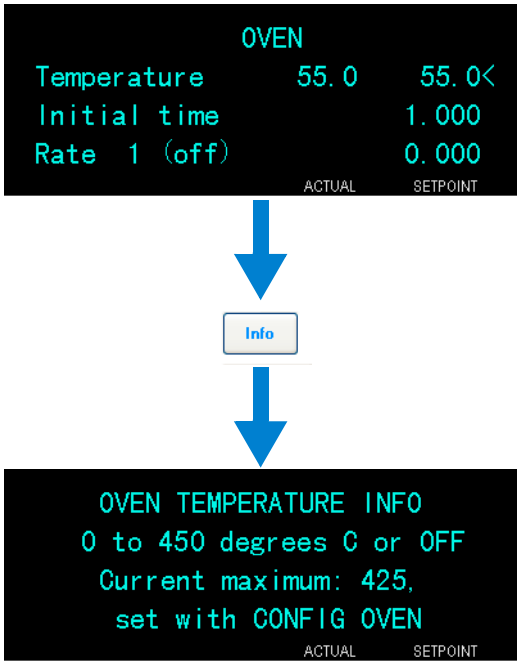
The order in which items appear in the scrolling display window for [**Status**] can be modified. You may, for example, want to display the things you most frequently check in the top three lines so that you do not need to scroll to see them. To change the order of the **Status** display:

1. Press [**Config**] [**Status**].
2. Scroll to the setpoint you want to appear first and press [**Enter**]. This setpoint will now appear at the top of the list.
3. Scroll to the setpoint you want to appear second and press [**Enter**]. This setpoint will now be the second item on the list.
4. Continue as above until the list is in the order you require.

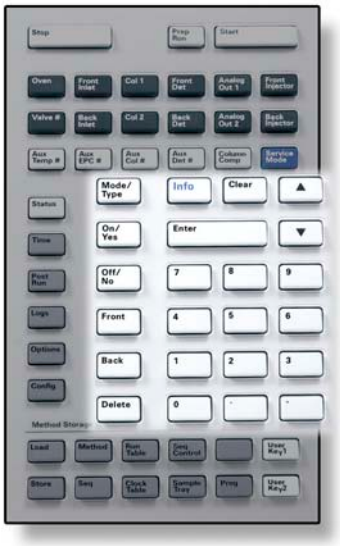
The Info Key

[**Info**]

Provides help for the currently shown parameter. For example, if **Oven Temp** is the active line in the display (has a < next to it), [**Info**] will display the valid range of oven temperatures. In other cases, [**Info**] will display definitions or actions that need to be performed.



The General Data Entry Keys



[**Mode/Type**] Accesses a list of possible parameters associated with a component's nonnumeric settings. For example, if the GC is configured with a split/splitless inlet and the [**Mode/Type**] key is pressed, the options listed will be split, splitless, pulsed split, or pulsed splitless.

[**Clear**] Removes a misentered setpoint before pressing **[Enter]**. It can also be used to return to the top line of a multiline display, return to a previous display, cancel a function during a sequence or method, or cancel loading or storing sequences and methods.

[**Enter**] Accepts changes you enter or selects an alternate mode.

Scrolls up and down through the display one line at a time. The < in the display indicates the active line.

Numeric Keys Are used to enter settings for the method parameters. (Press [**Enter**] when you are finished to accept the changes.)

[**On/Yes**] [**Off/No**] Are used when you are setting up parameters, such as the warning beep, method modification beep, and key click or for turning on or off a device like a detector.

[Front] [Back] Are mostly used during configuration operations. For example, when configuring a column, use these keys to identify the inlet and detector to which the column is attached.

[**Delete**] Removes methods, sequences, run table entries, and clock table entries. [**Delete**] also aborts the adjust offset process for nitrogen-phosphorus detectors (NPD) without interrupting other detector parameters. See the Advanced User Guide for more details.

The Supporting Keys

[**Time**] Displays the current date and time on the first line.

The two middle lines show the time between runs, the elapsed time and time remaining during a run, and the last run time and post-time during a post-run.

The last line always displays a stopwatch. While on the stopwatch line, press [**Clear**] to set the clock to zero and [**Enter**] to start or stop the stopwatch.

[**Post Run**] Is used to program the GC to do something after a run, such as bakeout or backflush a column. See the Advanced User Guide for details.

[**Logs**] Toggles between three logs: the Run Log, the Maintenance Log, and the System Event Log. The information in these logs can be used to support Good Laboratory Practices (GLP) standards.

[**Options**] Accesses the instrument parameters setup option, such as keypad, and display, and diagnostics. Scroll to the desired line and press **[Enter]** to access the associated entries. See the Advanced User Guide for details.

[**Config**] Is used to set up components that are not automatically detectable by the GC but are essential to running a method, such as column dimensions, carrier and detector gas types, makeup gas configurations, sample tray settings, and column plumbing to inlets and detectors. These settings are part of, and are stored with, the method.

To view the current configuration for a component (such as the inlet or detector), press **[Config]**, then the component key of interest. For example, **[Config][Front Det]** opens front detector configuration parameters.

Method Storage and Automation Keys

These keys are for loading and storing methods and sequences locally on your GC. They cannot be used to access methods and sequences stored by your Agilent ChemStation.

[**Load**] [**Method**] [**Store**] [**Seq**]

Are used to load and store methods and sequences on your GC.

To load a method, press [**Load**] [**Method**] and select one from the list of methods stored in the GC. See the Advanced User Guide for more details on these operations.

[**Run Table**] Is used to program special events you require during a run. A special event could be switching a valve, for example. See the Advanced User Guide for details.

[**Clock Table**] Is used to program events to occur at a time of day, as opposed to during a specific run. This could, for example, be used to start a shutdown run at 5:00 p.m. every day. See the Advanced User Guide for details on this function.

[**Seq Control**] Starts, stops, pauses, or resumes a sequence, or views the status of a sequence. See the Advanced User Guide for details.

[**Sample Tray**] Displays whether the tray and/or bar code reader is enabled.

[**Prog**] [**User Key 1**] [**User Key 2**]

Allows you to program a series of keystrokes commonly used for specific operations. See the Advanced User Guide.

Keypad Functionality When the GC Is Controlled by an Agilent Data System

When an Agilent data system controls the GC, the data system defines the setpoints and runs the samples. If configured to lock the keypad, the data system can prevent the changing of setpoints. The **Remote** LED is lit when a data system is controlling the GC. Lit LEDs on the status board show the current progress of a run.

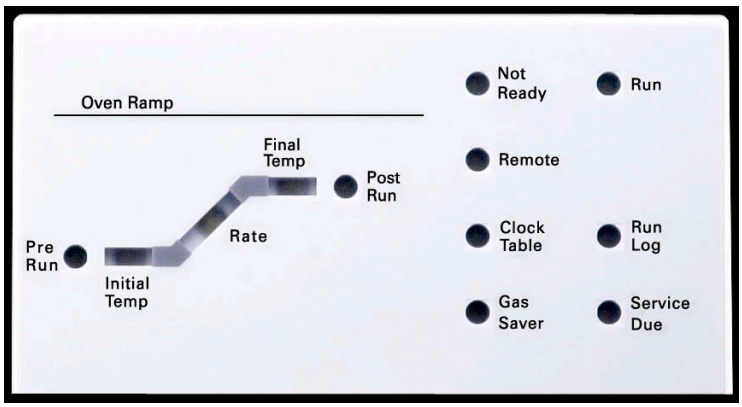
When an Agilent data system controls the GC, the keypad can be used:

- To view run status by selecting [**Status**]
- To view the method settings by selecting the GC component key
- To display the last and next run times, the run time remaining, and the post-run time remaining by repeatedly selecting [**Time**]
- To abort a run by selecting [**Stop**]
- To find which computer is controlling the GC by pressing **[Options] > Communication**, then scrolling. The name of the computer controlling the GC is listed under the **Enable DHCP** setting, along with the number of hosts connected to the GC.

About GC Status

When the GC is ready to begin a run, the display screen shows **STATUS Ready for Injection**. Alternatively, when a component of the GC is not ready to begin a run, the **Not Ready** LED is lit on the status board. Press [**Status**] to see a message explaining why the GC is not ready.

Status Board



A lit LED on the status board indicates:

- The current progress of a run (**Pre Run**, **Post Run**, and **Run**).
- Items that may require attention (**Rate**, **Not Ready**, **Service Due**, and **Run Log**).
- The GC is controlled by an Agilent data system (**Remote**).
- The GC is programmed for events to occur at specified times (**Clock Table**).
- The GC is in gas saver mode (**Gas Saver**).

Alert tones

A series of warning beeps sounds before a shutdown occurs. After a short time the component with the problem shuts down, the GC emits one beep, and a brief message is displayed. For example, a series of beeps sounds if the front inlet gas flow cannot reach setpoint. The message **Front inlet flow shutdown** is briefly displayed. The flow shuts down after 2 minutes. Press **[Clear]** to stop the beep.

A continuous tone sounds if a hydrogen flow is shut down or a thermal shutdown occurs.

WARNING **Before resuming GC operations, investigate and resolve the cause of the hydrogen shutdown. See Hydrogen Shutdown in the Troubleshooting manual for details.**

One beep sounds when a problem exists, but the problem will not prevent the GC from executing the run. The GC will emit one beep and display a message. The GC can start the run and the warning will disappear when a run starts.

Fault messages indicate hardware problems that require user intervention. Depending on the type of error, the GC emits no beep or a single beep.

Error conditions

If a problem occurs, a status message appears. If the message indicates broken hardware, more information may be available. Press the applicable component key (for example, **Front Det**, **Oven**, or **Front Inlet**).

Blinking setpoint

If the system shuts down a gas flow, multiposition valve, or the oven, **Off** will blink on the appropriate line of the component's parameter listing.

If there is a detector pneumatics shutdown or failure in another part of the detector, the detector **On/Off** line of the detector's parameter list blinks.

About Logs

Three logs are accessible from the keypad: the run log, the maintenance log, and the system event log. To access the logs, press **[Logs]** to toggle to the desired log. The display will indicate the number of entries the log contains. Scroll through the list.

Run log

The run log is cleared at the start of each new run. During the run, any deviations from the planned method (including keypad intervention) are listed in the run log table. When the run log contains entries, the **Run Log** LED lights.

Maintenance log

The maintenance log contains entries made by the system when any of the user-defined component counters reach a monitored limit. The log entry contains a description of the counter, its current value, the monitored limits, and which of its limits has been reached. In addition, each user task related to the counter is recorded in the log, including resetting, enabling or disabling monitoring, and changing limits or units (cycles or duration).

System event log

The system event log records significant events during the GC's operation. Some of the events also appear in the run log if they are in effect during a run.

5 Operating the 7693A Automatic Sampler

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This section describes the basic operation of the 7693A automatic liquid sampler (ALS). For complete information, refer to the Agilent 7693A Automatic Liquid Sampler Installation, Operation, and Maintenance manual.

Placing Vials in the 7693A ALS

Two turrets are provided with the G4513A injector (Figure 1). The 16-sample standalone turret, and the 3-sample transfer turret.

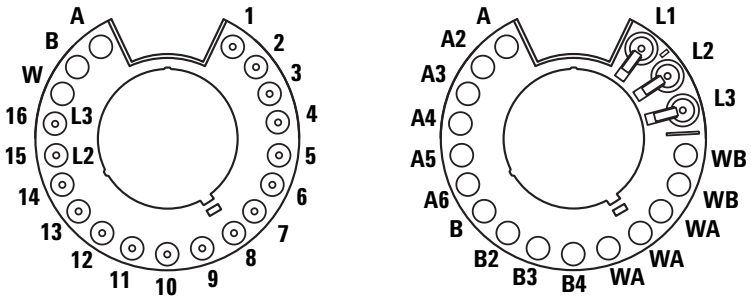


Figure 1 Injector turrets

The labeled positions are defined in Table 1 and Table 2.

Table 1 Standalone turret labels

Position	Label	Bottle/Vial
1 through 14	1 through 14	Sample vials
15	15 L2	Sample vial Layer 2 bottle
16	16 L3	Sample vial Layer 3 bottle
17	W	Waste bottle
18	B	Solvent B bottle
19	A	Solvent A bottle

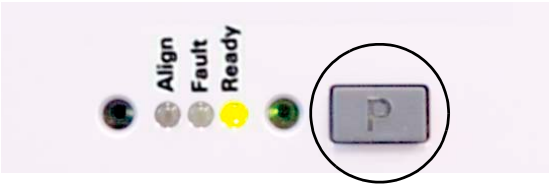
Table 2 Transfer turret labels

Position	Label	Bottle/Vial
1	L1	Dedicated vial transfer position A Layer 1 bottle
2	L2	Configurable vial transfer position B Layer 2 bottle
3	L3	Configurable vial transfer position C Layer 3 bottle
4 and 5	WB	Waste B1 - B2 bottles
6 through 8	WA	Waste A1 - A3 bottles
9 through 12	B - B4	Solvent B1 - B4 bottles
13 through 18	A - A6	Solvent A1 - A6 bottles

Placing vials in the sample tray

You must use the transfer turret.

1 Park the sample tray by pushing the **[P]** button on the sample tray front panel.



The gantry will move to the far-left position (away from the tray bracket), and gripper jaw will move to the far-back position (away from the tray front panel). This allows for clear access to the tray base.

2 Place up to 150 samples in the three vial racks, according to the programmed sequence. Figure 2 shows tray loading for a sequence that uses tray positions 6 through 21.

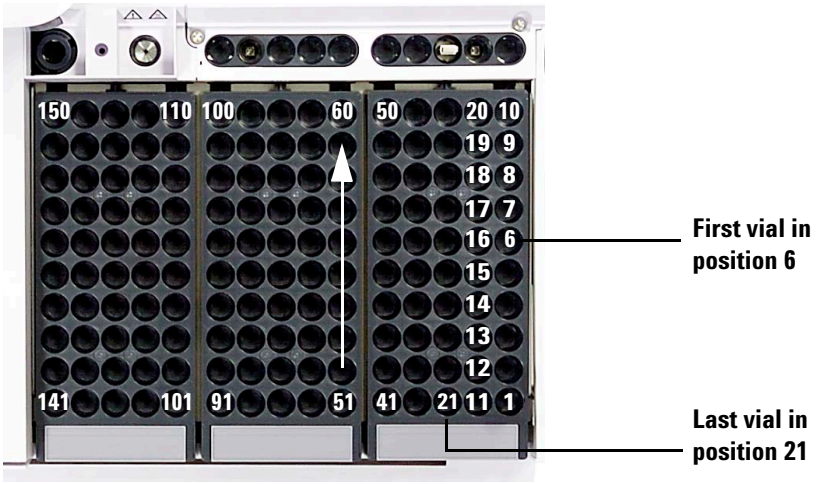


Figure 2 Loading tray positions

3 When finished loading the tray, press **[P]** on the tray front panel to move the gantry from the Park position to the Home position. (To use the sample tray, the gantry must be out of the Park position.)

Placing vials in the turret (no sample tray)

You can place up to sixteen vials, a solvent A, a solvent B, and a waste bottle in the standalone turret. If you use the transfer turret, you can load three sample vials and the solvent and waste bottle capacity increases to 15 (Figure 1).

Placing vials for sandwich injections

The ALS system has the ability to draw liquid from multiple vials to create multilayered, or sandwich, injections. Each layer of sample, internal standard, or solvent can be separated by a layer of air (from 0% to 10% of the syringe size). Figure 3 and Figure 4 show examples of 2-and 3-layer sandwich injections.

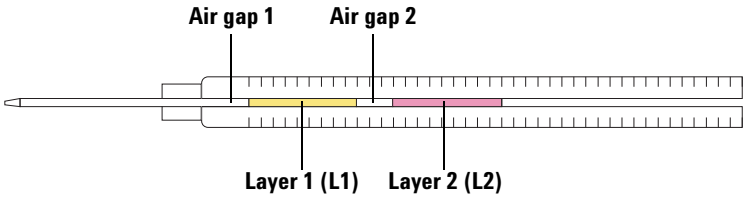


Figure 3 2-layer sandwich injection

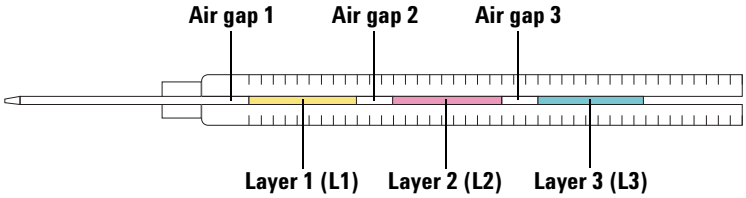


Figure 4 3-layer sandwich injection

When loading vials for sandwich injections, layer 1 (L1) can be placed in any turret position 1-14 if using a standalone turret, or in any tray position 1-150 if using a transfer turret with sample tray. The vials for layer 2 (L2) and layer 3 (L3) must be placed in turret positions **L2** and **L3** (Figure 5), respectively.

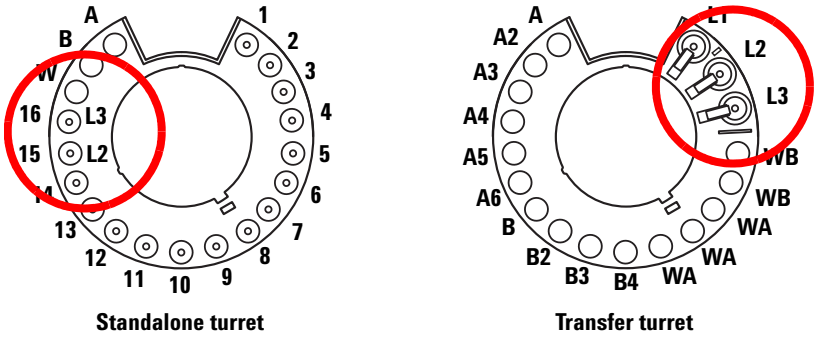
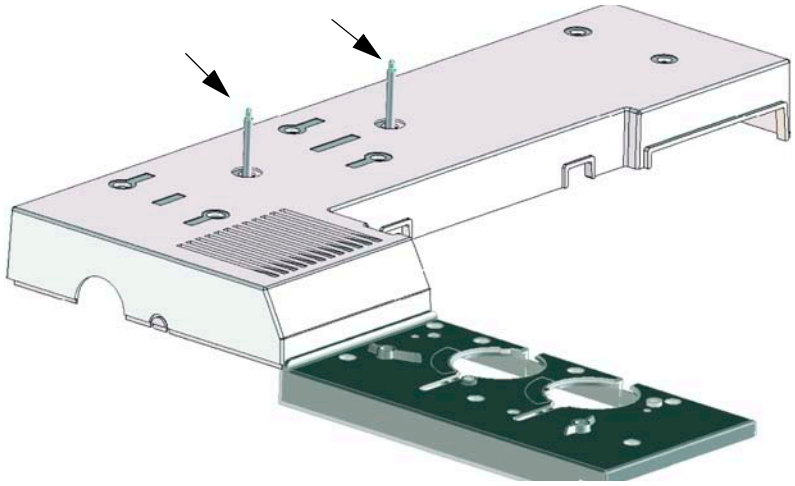


Figure 5 Turret vial locations for sandwich injections

To Park the Injector

To park an injector (safely set it aside so it is not used), simply place it on an installed parking post (G4513-20562).



To Install a Syringe on the 7693A ALS

To install a syringe (Figure 6):

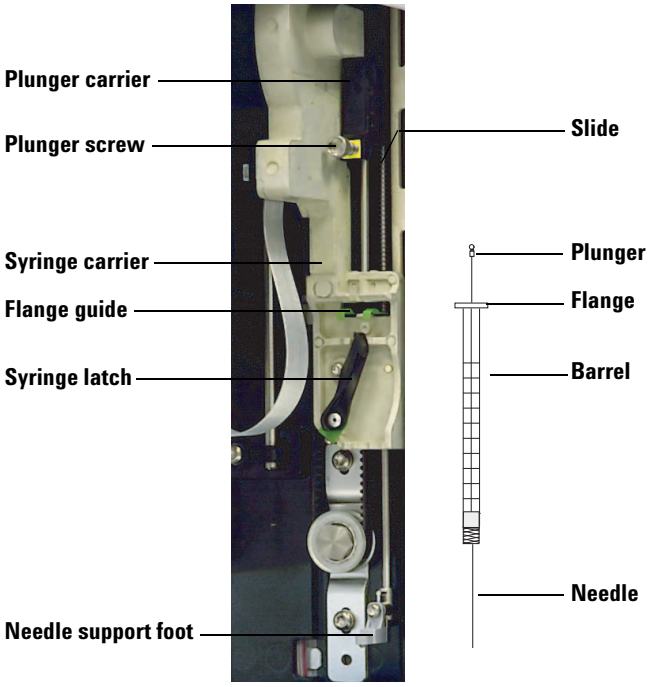


Figure 6 Installing a syringe

1. Unplug the injector cable, and if desired, mount the injector on a parking post, or lay the injector tower on a work bench.
2. Open the injector door.
3. Slide the syringe carriage to the top position.
4. Open the syringe latch by swinging it in a counterclockwise direction.
5. Lift the plunger carrier to the top position.
6. Carefully pass the syringe needle through the guide hole in the needle support foot.
7. Align the syringe flange with the flange guide and press the syringe into place, keeping the needle end in the guide hole of the needle support foot.
8. Close the syringe latch by swinging it clockwise until it snaps in place.
9. Loosen the plunger screw entirely by turning it counterclockwise until the stop is reached.

10 Slide the plunger carrier down until it is completely over the syringe plunger, and tighten the plunger thumb screw until finger-tight.

11 Manually move the plunger carrier up and down. If the syringe plunger does not move along with the carrier, repeat the previous steps until installed correctly. Be sure the plunger thumb screw is secure and tight. If the carrier is not completely attached to the syringe plunger it may become detached after a few injections.

CAUTION Repeating this movement can damage the syringe.

12 Verify that the needle is inside the guide hole of the needle support foot. The needle should be straight and pass freely through the needle guide hole.

If the needle is bent or is outside the guide hole, remove the syringe and reinstall. See Figure 7 for a properly installed syringe.

Figure 7 Syringe carriage and needle support with syringe installed

13 Close the injector door.

14 Do the following only if the injector tower was removed from the mounting post during installation:

a If necessary, plug in the injector cable.

b Install the injector on the mounting post.

c If you have a sample tray, calibrate the ALS system.

To Remove the Syringe on the 7693A ALS

To remove a syringe:

1. Unplug the injector cable, and if desired, mount the injector on a parking post.
2. Open the injector door.
3. Slide the syringe carriage to the top position.
4. Completely loosen the plunger thumb screw until it reaches the stop, and lift the plunger carrier off of the syringe plunger.
5. Open the syringe latch by swinging it in a counterclockwise direction.

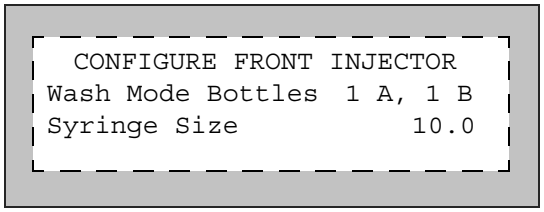
CAUTION Be careful not to bend the syringe needle. Only pull the syringe out of the carriage until clear. The needle bends easily when still seated in the needle support guide.

6. Carefully pull the top of the syringe out of the flange guide, then lift the needle out of the needle support foot.

To install a syringe, see "To Install a Syringe on the 7693A ALS" for details.

To Configure Solvent/Waste Vials

Press **[Config]** **[Front Injector]** or **[Config]** **[Back Injector]** on the GC keypad to display the front or back injector configuration parameters.



Wash Mode Bottles — This is only displayed when the injector has a transfer turret installed. The turret solvent bottle positions are selected using the **[Mode/Type]** key:

6-A and 4-B Washes — Uses all 6 solvent A bottles if injector uses solvent A washes. Uses all 4 solvent B bottles if injector uses solvent B washes. The injector alternates between all bottles.

2-A and 2-B Washes — Uses solvent bottles A and A2 if injector uses solvent A washes and solvent bottles B and B2 if injector uses solvent B washes. The injector alternates between all bottles.

1-A and 1-B Washes — Uses solvent bottle A if injector uses solvent A washes and solvent bottle B if injector uses solvent B washes.

The injector always uses both WA waste bottles if a solvent A wash is used and both WB waste bottles if a solvent B wash is used.

Syringe size — Enter a syringe size between 0.5 and 500 µL.

NOTE The GC assumes the syringe volume represents full plunger stroke. If the maximum volume marked on the syringe barrel is halfway up the barrel, you will need to enter **double** that volume (the label in this case is half of the full plunger stroke).

7693A ALS Prerun Checklist

Use this checklist before running analyses to make sure that the sample vials and sampler are ready.

- ❑ Sample vials are at least half full.
- ❑ Vial cap is centered, with no wrinkles, and the septum is flat.
- ❑ Sample vial positions match the run parameters.
- ❑ Each solvent bottle contains 4.5 mL of fresh solvent.
- ❑ Waste bottles are empty.
- ❑ Syringe door is closed.
- ❑ Sufficient solvent and waste capacity is available for sample vials.
- ❑ Syringe is new or clean.
- ❑ Syringe design and size are correct.
- ❑ Plunger is secure in plunger carrier loop.
- ❑ Needle is aligned with septum retainer nut.
- ❑ Syringe is rinsed with solvent.
- ❑ GC inlet liner is clean and deactivated.
- ❑ GC inlet liner or insert is correct type for injection technique.
- ❑ GC inlet septum type is correct.
- ❑ GC inlet septum has sufficient life remaining.
- ❑ Correct septum nut is installed in GC inlet.

To Move the 7693A ALS to the Other GC Inlet

1 When no runs are scheduled, lift the injector tower off the mounting post.

2 If a tray is installed, disconnect the communications cable from the injector tower.

3 Set the injector tower aside. (Place on a parking post or lay it flat on its back.)

CAUTION Use a flathead screwdriver that snugly fits the slot in the top of the mounting post. An undersized blade can damage the post top and prevent the injector from mounting properly.

4 Remove the mounting post from the inlet cover. Install it at the other location. The post must be tightened completely.

5 If a sample tray is installed, route the front injector cable through the mounting bracket support structure. If installing a back injector, make sure the cable is available.

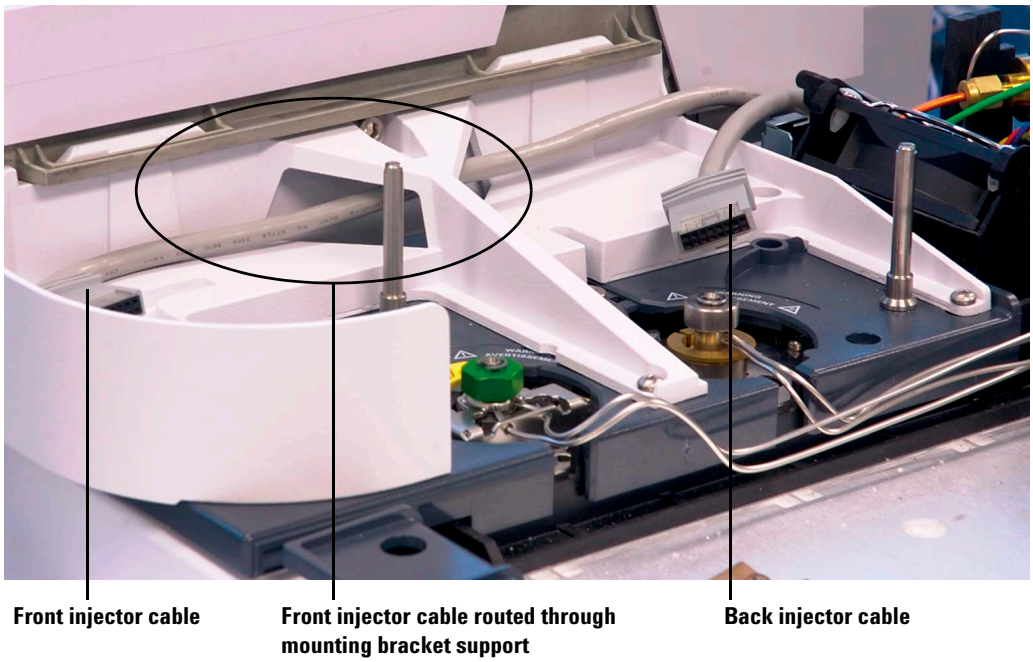


Figure 8 Front injector cable routed through mounting bracket support.

6 If the injector cable is disconnected, reconnect it to the injector cable port.

7 Position the injector on the desired mounting post and inlet cover support foot.

Check your work

The injector must be vertical and stable.

If the injector will not sit upright on the GC, check that the plumbing and cabling under the inlet cover are properly routed in their channels. If a tray is installed, also verify that the front injector cable is routed correctly through the GC mounting bracket support as shown in Figure 8.

If using a tray, you should calibrate the system. Refer to the 7693A ALS Installation, Operation, and Maintenance manual.

Impact on your data system

After moving the injector, an Agilent data system will detect the configuration change and may prompt you to verify the loaded method.

Verify the data system will use the new injection source for any runs.

To Adapt the 7693A ALS for the COC Inlet

The 7693A injectors can inject samples directly into 250-µm, 320-µm, and 530-µm columns in GCs with a cool-on-column inlet.

When performing cool on-column injections, the injector:

- Slows the carriage speed so the overall injection time increases to 500 milliseconds.
- Lowers the tip of the syringe needle an additional 19 mm into the column.

To adapt the injector and GC for cool on-column use, follow these steps:

1. If necessary, remove the current syringe from the injector. See "To Remove the Syringe on the 7693A ALS" for more information.
2. If necessary, remove the injector from the mounting post and unplug the injector cable. If desired, park it on a parking post.
3. Select the on-column syringe needed for the column size. See your Agilent catalog for consumables and supplies, your GC operating documentation, and the Agilent web site (www.agilent.com/chem) for a list of parts.
4. Replace the needle support foot with the supplied on-column foot. See the Agilent 7693A Automatic Liquid Sampler Installation, Operation, and Maintenance manual for more information.
5. Install the on-column syringe. See "To Install a Syringe on the 7693A ALS" for more information.
6. Prepare the GC inlet. See your GC operating documentation for instructions.
   - Check your needle to column size.
   - Verify that the insert matches the needle size.
   - If necessary, replace the septum.

   For a list of other consumables needed to perform these injections, see your GC operating documentation.
7. Plug in the injector cable.
8. Install the injector on the mounting post.

6
Operating the 7683 Automatic Sampler

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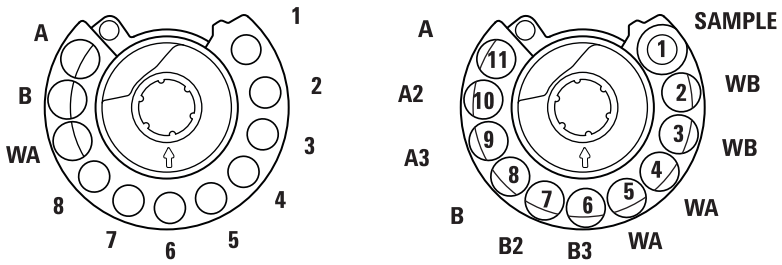
This section describes the basic operation of the 7683 automatic liquid sampler (ALS). The procedures here expand on the information provided in the Agilent 7683B Automatic Liquid Sampler Installation, Operation, and Maintenance manual.

7683 ALS Turret Types

The injector comes with two turrets, a standard 1-sample transfer turret for use with or without a tray, and an 8-sample turret to be used without a tray.



Hi-density turret (8-samples)

Transfer turret (1-sample)

Top views. Labels are on sides.

The labeled positions are defined in Table 4 and Table 3.

Table 3 The 8-sample vial turret

Name	Position	Description
1 through 8	1 through 8	Sample vials
WA	9	Waste bottle
B	10	Solvent bottle B
A	11	Solvent bottle A

Table 4 The 1-sample vial transfer turret

Name	Position	Description
SAMPLE	1	Sample vial transfer position
WB	2 and 3	Waste bottle B
WA	4 and 5	Waste bottle A
B3	6	Solvent bottle B3
B2	7	Solvent bottle B2
B	8	Solvent bottle B
A3	9	Solvent bottle A3
A2	10	Solvent bottle A2
A	11	Solvent bottle A

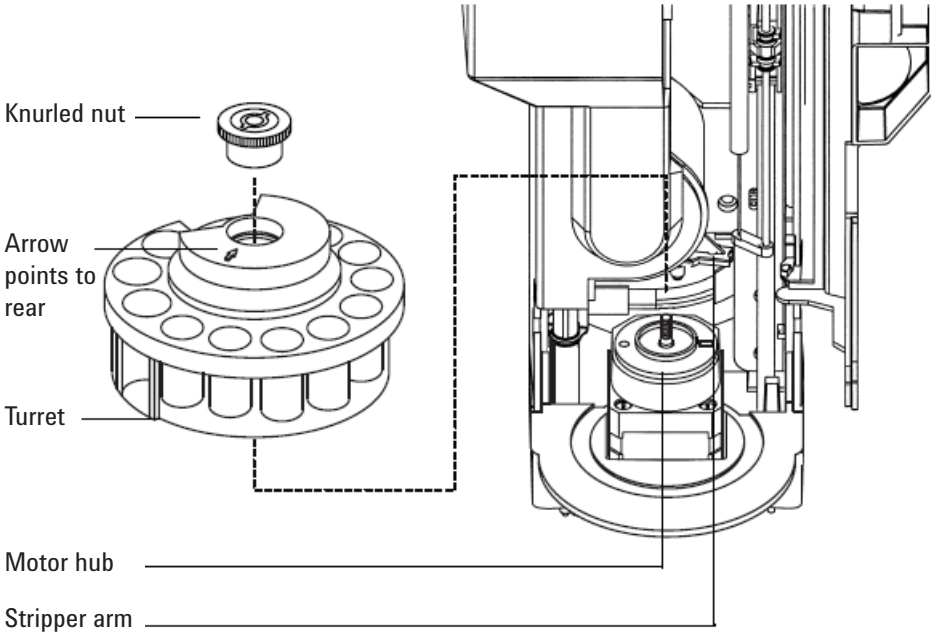
To Change the 7683 ALS Turret

1 If the GC does not have a tray, proceed to step 2. Otherwise, do the following:

- If changing from the 1-sample transfer turret to the 8-sample turret, press **[Sample Tray] [Off/No]**.
- If changing from the 8-sample turret to the 1-sample turret for tray use, press **[Sample Tray] [On/Yes]**.

2 Open the injector door. Unscrew and remove the knurled nut from the top of the turret.

3 Rotate the turret so that the open section faces and the arrow on top of the turret points to the back of the injector. Push the stripper arm toward the back, then lift the front of the turret so that it clears the center shaft. Remove the turret.



4 Push the stripper arm to the back of the tower. Insert the turret with the open section facing and the arrow pointing to the back of the injector.

5 Seat the turret on the hub, rotating it gently until it drops partially into position, then push it down. The top of the threaded shaft will be almost level with the top of the turret.

6 Replace the knurled nut and firmly finger-tighten.

7 Close the injector door. The injector will verify the turret type if the injector is on. If the **Fault** light comes on, the turret is not installed correctly.

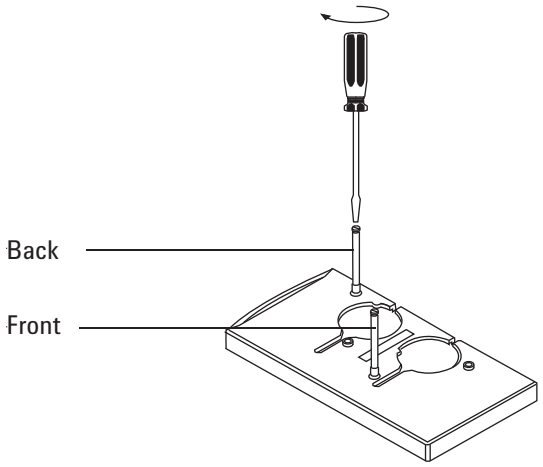
To Move the 7683 ALS to the Other GC Inlet

1 When no runs are scheduled, unplug the injector from the back of the GC.

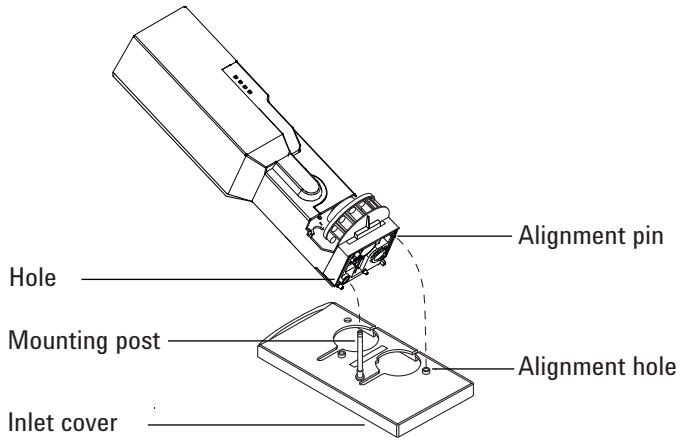
2 Lift the injector tower off the mounting post and set it aside.

CAUTION Use a flathead screwdriver that snugly fits the slot in the top of the mounting post. An undersized blade can damage the post top and prevent the injector from mounting properly.

3 Remove the mounting post from the inlet cover. Install it at the other location. The post must be tightened completely.



4 Line up the hole in the base of the injector with the mounting post. Lower the injector about 1 inch (2.5 cm) onto the post.



5 Turn the injector so that the turret faces either:
   - The front of the GC (for front location)
   - The left side of the GC (for back location)

6 Lower the injector until the alignment pin in the base enters the alignment hole in the inlet cover.

7 If using a tray with the turret in the front location, route the injector cable to the right through the channel in the front of the tray and under the cable holder.

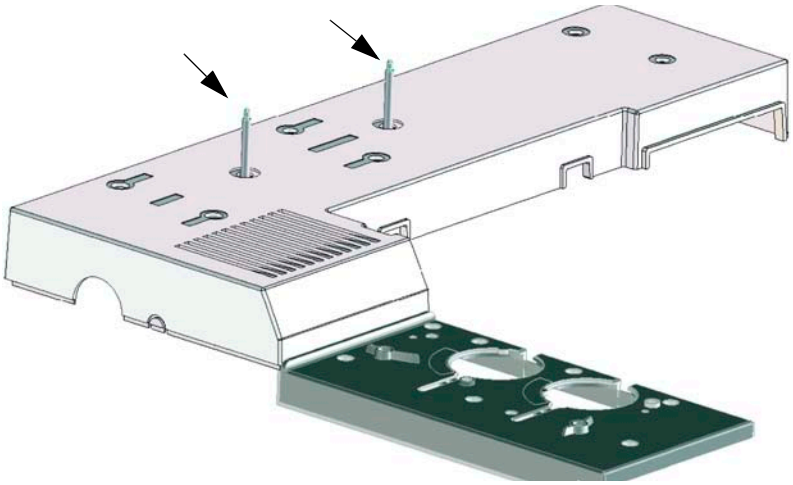
8 Verify the following for proper installation:
   - The injector is vertical. (If the injector does not sit upright on the GC, check that the plumbing and cabling under the inlet cover are properly routed in their channels.)
   - The alignment pin is properly seated in the alignment hole.
   - The injector feet touch the inlet cover.

9 Plug the injector into the GC back panel. For the front inlet injector location use the connector labeled sampler 1. For the back inlet injector location use the connector labeled sampler 2.

To Park the Injector

The parking post for the injector has been replaced by a new design, which is compatible with former designs.

- Former parking post = 05890-20795 (not compatible with 7890A)
- New parking post = G4513-20562 (compatible with 7890A and previous GCs)



To park the injector, simply place it on an installed post.

To Install a Syringe on the 7683 ALS

1 Open the injector door.

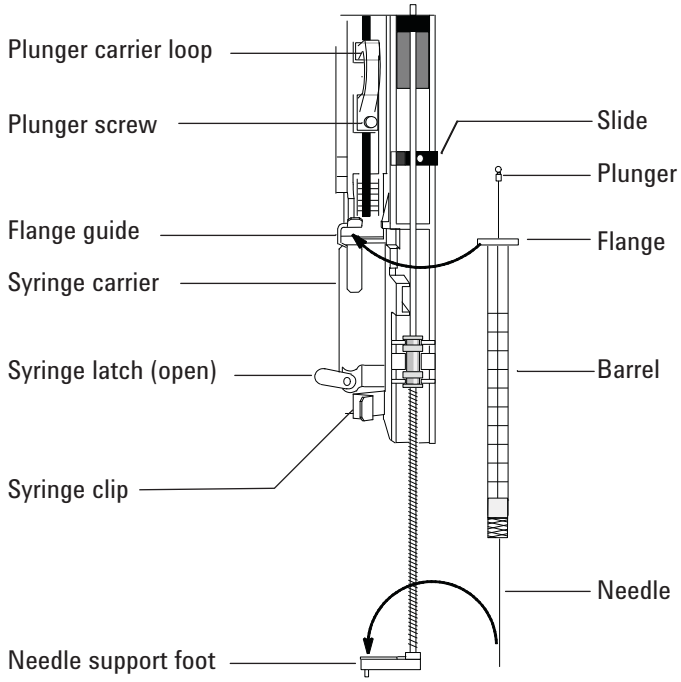
2 Remove the syringe, if necessary. (See "To Remove the Syringe on the 7683 ALS".)

3 Slide the syringe carriage up (or down).

4 Pass the syringe needle through the hole in the needle support foot.

5 Align the syringe barrel with the flange guide and syringe clip and press the syringe into place, keeping the needle in the hole of the needle support foot.

6 Close the syringe latch by swinging it clockwise.

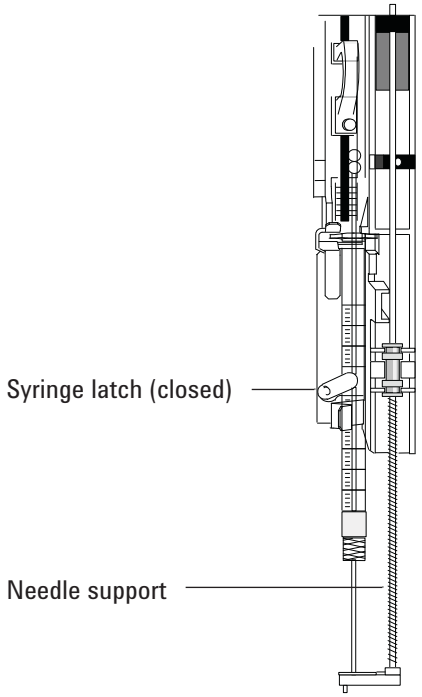


7 Loosen the plunger screw until the stop is reached.

8 Move the plunger carrier loop down and tighten the plunger screw.

9 Move the plunger carrier loop up and down. If the syringe plunger does not move along with the plunger carrier loop, repeat steps 4 through 8. Be sure the plunger screw is tight.

10 Check that the needle is aligned with the needle guide in the needle support foot by moving the slide up and down. The needle should slide smoothly in the needle guide.



CAUTION Do not operate the injector without a syringe in place. The syringe latch may interfere with the motor if the latch is allowed to swing freely.

11 Pull down the syringe carriage until the needle support guide tip is near the top of the inlet septum nut.

The needle support guide should be centered over the hole in the septum retainer nut. Make sure that the needle will hit the septum without rubbing on the nut.

12 From the GC keypad, configure the injector with the installed syringe size.

a Press **[Config] [Front Injector]** or **[Config] [Back Injector].**

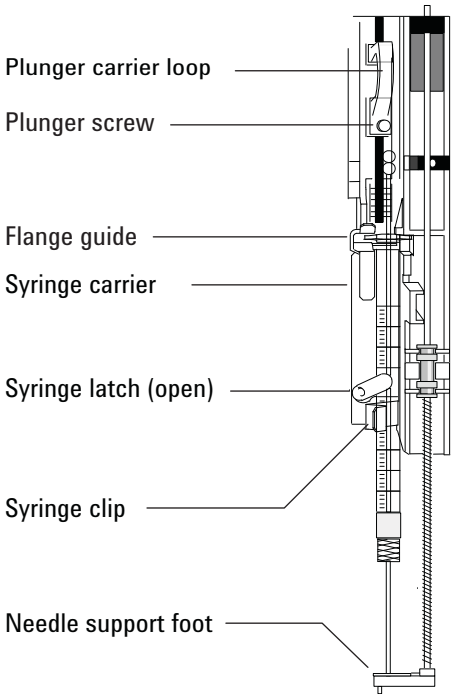
b Scroll to **Syringe Size** and enter the size of the installed syringe.

To Remove the Syringe on the 7683 ALS

1 Open the injector door.

2 Loosen the plunger screw and raise the plunger carrier loop off the syringe plunger.

3 Open the syringe latch.



CAUTION Be careful not to bend the syringe needle. Only pull the syringe out of the carriage until clear. The needle bends easily when still seated in the needle support guide.

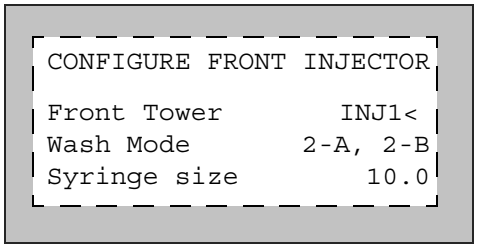
CAUTION To limit potential needle puncture hazards, proper laboratory safety and correct personal protective equipment (PPE) should be used.

4 Carefully lift the syringe flange out of the flange guide until clear, then lift the syringe needle out of the needle support guide.

To Configure Solvent/Waste Vials

1 Press [**Config**] [**Front Injector**] or [**Config**] [**Back Injector**] to display the parameters.

2 Scroll to the desired parameter detailed below.



`Front Tower` (or `Back Tower`)—Press [**Mode/Type**] to select the correct injector connection. The example above shows that the front injector tower is connected to the SAMPLER1 (INJ1) connector on the back of the GC.

`Wash Mode`—Press [**Mode/Type**] to set the wash mode when using a sampling tray. The wash modes allow you to use extra solvent A and solvent B wash vials to extend the number of samples you can run before refilling the vials. The choices are:

`3-A, 3-B`—Use 3 wash A and 3 wash B solvent vials, alternating between them.

`1-A, 1-B`—Use 1 wash A and 1 wash B solvent vial.

`2-A, 2-B`—Use 2 wash A and 2 wash B solvent vials, alternating between them.

When running a sequence with wash mode 3-A, 3-B (for example), the injector will use wash vial positions A and B for the first sample, wash vial positions A2 and B2 for the second sample, and wash vial positions A3 and B3 for the third sample, For the fourth sample, the injector returns to use wash vials A and B. See “7683 ALS Turret Types” for a diagram that explains the wash vial positions in the turret.

If a solvent wash is not used for the current sample, it is skipped. For example, if you use only solvent A washes for the second sample, the solvent B2 wash vial is skipped.

When running single samples, only solvent wash vials A and B are used.

`Syringe size`—Enter a syringe size (at full plunger stroke) between 1 and 100 µL.

The G2913A injector always uses both WA waste bottles if a solvent A wash is used and both WB waste bottles if a solvent B wash is used.

`Waste bottle mode`—G2613A This is only displayed when the G2613A injector has a 3-vial turret installed. The turret waste bottle positions are controlled using the [**Mode/Type**] key:

- `Use both A and B` alternates between the two waste bottles
- `Use only A bottle` uses waste bottle A only
- `Use only B bottle` uses waste bottle B only

`Use B2 wash`—G2613A This is only displayed if you have the 3-vial turret installed in the G2613A injector. You can enable this option to use two 4 mL vials of solvent B, increasing the number of runs you can make before refilling solvent vials. Press the [**On**] button to enable B2 wash.

- Use the same solvent in position B and in position B2. (This option does not enable you to use a third solvent.)
- When using solvent A and solvent B, both waste bottles are required.
- Your maximum solvent capacity is 6 mL (2 mL each for solvent vials A, B, and B2).
- Configure each injector separately.

Note that the number of solvent B washes for each injection does not change. The injector simply alternates use between the two solvent B vials.

This mode allows the number of solvent B washes to be twice that of the solvent A washes.

To Load Vials in the 7683 ALS Turret

1 Load waste and solvent bottles in the appropriate positions. Be sure that there is a waste bottle in each position of the turret, regardless of which ones are configured in the method.

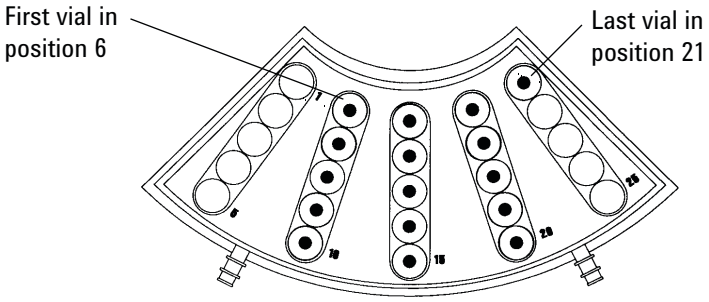
2 Load the sample vial(s) in the appropriate locations (Positions 1 through 8 for an 8-sample turret and Position 1 for a 1-sample turret when not using a tray).

To Load Vials in the 7683 ALS Sampler Tray

1 Install the 1-sample turret, if not already installed. (See "To Change the 7683 ALS Turret".)

2 Place up to 100 sample vials in the four tray quadrants according to the programmed sequence. Do not place a sample in the turret.

Tray loading for a sequence that uses tray positions 6 through 21 is shown below.



3 Review the "7683 ALS Prerun Checklist" before starting a run.

7683 ALS Prerun Checklist

Use this checklist before running analyses to make sure that the sample vials and sampler are ready.

- ❑ Sample vials are at least half full.
- ❑ Vial cap is centered, with no wrinkles, and the septum is flat.
- ❑ Sample vial positions match the run parameters.
- ❑ Each solvent bottle contains 4.5 mL of fresh solvent.
- ❑ Waste bottles are empty.
- ❑ Syringe door is closed.
- ❑ Sufficient solvent and waste capacity is available for sample vials.
- ❑ Syringe is new or clean.
- ❑ Syringe design and size are correct.
- ❑ Plunger is secure in plunger carrier loop.
- ❑ Needle is aligned with septum retainer nut.
- ❑ Syringe is rinsed with solvent.
- ❑ GC inlet liner is clean and deactivated.
- ❑ GC inlet liner or insert is correct type for injection technique.
- ❑ GC inlet septum type is correct.
- ❑ GC inlet septum has sufficient life remaining.
- ❑ Correct septum nut is installed in GC inlet.

To Adapt the 7683 ALS for the COC Inlet

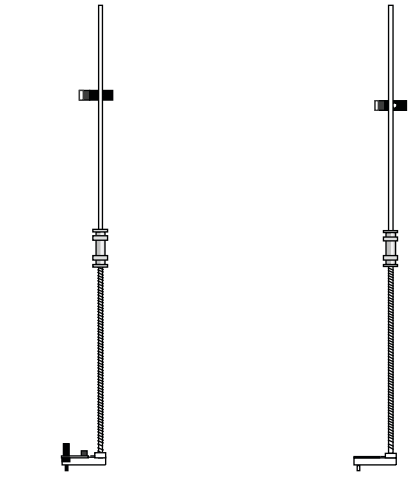
1 Select the on-column syringe needed for the column size. (See "Consumables and Parts for the COC Inlet".)

2 Check the needle-to-column size. (See To Check the Needle-to-Column Size with the COC Inlet.)

3 Verify that the insert matches the needle size. (See To Install an Insert on the COC Inlet.)

4 If necessary, replace the septum. (See To Change a Septum on the COC Inlet.)

5 Verify that the correct needle support assembly is installed in the injector. (See To Replace the Needle Support Assembly in a 7683 Injector.)



250 µm/320 µm (G2913-60978)

530 µm (standard, G2913-60977)

6 Install the syringe. (See "To Install a Syringe on the 7683 ALS".)

7 Rotate the turret clockwise until it stops, then verify the installation by manually sliding the syringe carriage down until the needle enters the inlet.

To Install a 200-µm Column With the COC Inlet

NOTE **Agilent recommends using a 530-µm retention gap for injections directly onto 200-µm columns.**

1 Prepare the inlet. (See To Prepare for Inlet Maintenance.)

WARNING **Be careful! The oven and/or inlet may be hot enough to cause burns. If either is hot, wear heat-resistant gloves to protect your hands.**

2 Install a short 530-µm retention gap (uncoated fused silica tubing) into the inlet. (See To Install a Capillary Column with the COC Inlet.)

3 Attach the retention gap to the 200-µm column using an Agilent Ultimate Union Kit (part numbers G3182-61580 and G3182-61581).

To Manually Inject Onto a 200-µm Column With the COC Inlet

1 If needed, prepare the column. (See "To Install a 200-µm Column With the COC Inlet".)

CAUTION These steps should be done smoothly, with minimal delay.

2 Immerse the syringe needle in the sample; pump the syringe plunger to expel air from the barrel and needle.

3 Draw the sample into the syringe.

4 Remove the needle from the sample and draw about 1 µL of air into the syringe.

5 Wipe the needle dry if it is wet.

6 Guide the needle straight into the septum nut, pierce the septum, and insert the needle fully into the inlet until it bottoms.

7 Press **[Start]** to start the run, depress the syringe plunger as quickly as possible, and withdraw the needle from the inlet.

7
About Methods, Sequences, and Data Analysis

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What Is a Method?

A method is the group of settings required to accurately analyze a specific sample.

Since every type of sample reacts differently in the GC—some samples require a higher oven temperature, others require a lower gas pressure or a different detector—a unique method must be created for each specific type of analysis.

What Is Saved in a Method?

Some of the settings saved in a method define how the sample will be processed when the method is used. Examples of method settings include:

- The oven temperature program required
- The type of carrier gas required
- The type of detector to be used
- The type of inlet to be used
- The type of column to be used
- The length of time to process a sample

Data analysis and reporting parameters are also stored in a method when it is created on an Agilent data system, for example ChemStation. These parameters describe how to interpret the chromatogram generated by the sample and what type of report to print.

See the Advanced User Guide for more details on what can be included in a method.

What Happens When You Load a Method?

There are two kinds of methods:

- **The active method**—This is sometimes referred to as the current method. The settings defined in this method are the settings the GC is currently maintaining.
- **User-stored methods**—Up to 20 methods can be stored in the GC.

When a method is loaded from the GC or Agilent data system, the setpoints of the active method are immediately replaced with the setpoints of the method loaded.

- The method loaded becomes the active (current) method.
- The **Not Ready** light will stay lit until the GC reaches all of the settings specified by the method that was just loaded.

Refer to "Running a Method or a Sequence from the Keypad" for details on using the keypad to load, modify, and save methods.

What Is a Sequence?

A sequence is a list of samples to be analyzed along with the method to be used for each analysis. Once defined, the sequence may run unattended, automatically processing the samples defined in the sequence.

Refer to "Running a Method or a Sequence from the Keypad" and the Advanced User Guide for details on how to create, load, modify, and save sequences using the keypad.

Automating Data Analysis, Method Development, and Sequence Development

Data compiled from samples (the output of the detectors) is digitized and can be sent to an automated data analysis system (such as the Agilent ChemStation), where it is analyzed and the results summarized in reports.

The Agilent ChemStation also can be used to create and store methods and sequences that are sent to the GC through a network.

7 About Methods, Sequences, and Data Analysis